

Claims

1. A chemical analysis apparatus comprising:
 - a reagent vessel provided with a reagent solution;
 - a sample vessel provided with a sample solution;
 - a reaction vessel to which said reagent and said sample are supplied;
 - a reagent supplying mechanism for supplying said reagent to said reaction vessel; and
 - a sample supplying mechanism for supplying said sample to said reaction vessel,

wherein at least one of said reagent supplying mechanism and said sample supplying mechanism comprises:

 - a probe portion for sucking and discharging the solution;
 - a probe arm portion communicated with said probe portion and moving said probe portion to said reagent vessel or said sample vessel and said reaction vessel; and
 - a pump to which a pipe is connected, said pipe being communicated with the pump from said probe portion via said probe arm portion, and

wherein a narrow area having a smaller cross sectional area than a cross sectional area of said pipe in said probe arm portion is provided in said pipe positioned between said probe arm portion and said pump

portion.

2. A chemical analysis apparatus comprising:

a reagent vessel provided with a reagent solution;

a sample vessel provided with a sample solution;

a reaction vessel to which said reagent and said sample are supplied;

a reagent supplying mechanism for supplying said reagent to said reaction vessel; and

a sample supplying mechanism for supplying said sample to said reaction vessel,

wherein at least one of said reagent supplying mechanism and said sample supplying mechanism comprises:

a probe portion for sucking and discharging the solution;

a probe arm portion communicated with said probe portion and moving said probe portion to said reagent vessel or said sample vessel and said reaction vessel; and

a pump to which a pipe is connected, said pipe being arranged from said probe portion via said probe arm portion, and

wherein a high resistance portion having a larger flow path resistance than a flow path resistance of said pipe in said probe arm portion is provided between said probe arm portion and said pump portion.

3. A chemical analysis apparatus comprising:
 - a reagent vessel provided with a reagent solution;
 - a sample vessel provided with a sample solution;
 - a reaction vessel to which said reagent and said sample are supplied;
 - a reagent supplying mechanism for supplying said reagent to said reaction vessel; and
 - a sample supplying mechanism for supplying said sample to said reaction vessel,
- wherein at least one of said reagent supplying mechanism and said sample supplying mechanism comprises:
 - a probe portion for sucking and discharging the solution;
 - a probe arm portion communicated with said probe portion and moving said probe portion to said reagent vessel or said sample supplying portion and said reaction vessel; and
 - a pump to which a pipe is connected, said pipe being communicated with the pump from said probe portion via said probe arm portion, and
- wherein an enlarged area having a larger cross sectional area than a cross sectional area of said pipe in said probe arm portion is provided in said pipe positioned between said probe arm portion and said pump portion.

4. A chemical analysis apparatus comprising:
 - a reagent vessel provided with a reagent solution;
 - a sample vessel provided with a sample solution;
 - a reaction vessel to which said reagent and said sample are supplied;
 - a reagent supplying mechanism for supplying said reagent to said reaction vessel; and
 - a sample supplying mechanism for supplying said sample to said reaction vessel,
- wherein at least one of said reagent supplying mechanism and said sample supplying mechanism comprises:
 - a probe portion for sucking and discharging the reagent;
 - a probe arm portion communicated with said probe portion and moving said probe portion to said reagent vessel or said sample vessel and said reaction vessel; and
 - a pump to which a pipe is connected, said pipe being communicated with the pump from said probe portion via said probe arm portion, and
 - wherein an elastic area structured by a material having a lower elastic modulus in tension than said probe and having a rigidity of elastic modulus in tension between 100 and 3000 kgf/cm² is provided in said pipe positioned between said probe arm portion and said

pump portion.

5. A chemical analysis apparatus as claimed in claim 1, wherein an area having a large cross sectional area in said narrow area is provided closer to the pump than said narrow area.

6. A chemical analysis apparatus comprising:

 a reagent vessel provided with a reagent solution;

 a sample vessel provided with a sample solution;

 a reaction vessel to which said reagent and said sample are supplied;

 a reagent supplying mechanism for supplying said reagent to said reaction vessel; and

 a sample supplying mechanism for supplying said sample to said reaction vessel,

 wherein at least one of said reagent supplying mechanism and said sample supplying mechanism comprises:

 a probe portion for sucking and discharging the solution;

 a probe arm portion communicated with said probe portion and moving said probe portion to said reagent vessel or said sample vessel and said reaction vessel;

 a first pump to which a pipe is connected, said pipe being communicated with the pump from said probe portion via said probe arm portion; and

a second pump communicated with said pipe in an upstream side of said probe arm portion via a branch portion, and

wherein said first pump has a higher discharge resolving power than said second pump, and said chemical analysis apparatus is controlled in such a manner as to supply a first flow rate of solution from said probe by driving said second pump and supply a second flow rate more than said first flow rate of solution by driving said first pump.

7. A chemical analysis apparatus comprising:

a reagent vessel provided with a reagent solution;

a sample vessel provided with a sample solution;

a reaction vessel to which said reagent and said sample are supplied;

a reagent supplying mechanism for supplying said reagent to said reaction vessel; and

a sample supplying mechanism for supplying said sample to said reaction vessel,

wherein at least one of said reagent supplying mechanism and said sample supplying mechanism comprises:

a probe portion for sucking and discharging the solution;

a probe arm portion communicated with said probe portion and moving said probe portion to said

reagent vessel or said sample vessel and said reaction vessel;

a first pump to which a pipe is connected, said pipe being communicated with the pump from said probe portion via said probe arm portion; and

a second pump communicated with said pipe in an upstream side of said probe arm portion via a branch portion, and having a lower discharge resolving power than said first pump, and

wherein said chemical analysis apparatus is controlled in such a manner as to start supplying said solution from said probe by said first pump after starting supplying said solution from said probe by said second pump.